U.S. Department
of Transportation

Research and
Special Programs
Administration

400 Seventh Street, S.W.
Washington, D.C. 20590

MAR 1 5 2004

DOT-E 8556
(FOURTEENTH REVISION)

EXPIRATION DATE: January 31, 2006

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: Air Products and Chemicals, Inc. (APCI)
Allentown, PA

(See Appendix A to this document for a list of additional grantees)

2. PURPOSE AND LIMITATION:

a. This exemption authorizes the transportation in commerce of the materials listed in paragraph 6 below, in super-insulated non-DOT specification portable tanks. This exemption provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein.

b. The safety analyses performed in development of this exemption only considered the hazards and risks associated with transportation in commerce.

3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.

4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR §§ 173.318 and 176.76(g)(1) in that a non-DOT specification packaging is not authorized except as specified herein.

5. BASIS: This exemption is based on the application of Air Products and Chemicals, Inc. dated January 8, 2004, submitted in accordance with § 107.109.

6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Hazardous Materials Description			
Proper Shipping Name	**Hazard Class/ Division**	**Identification Number**	**Packing Group**
Helium, refrigerated liquid (cryogenic liquid)	2.2	UN1963	N/A
Hydrogen, refrigerated liquid (cryogenic liquid)	2.1	UN1966	N/A
Nitrogen, refrigerated liquid (cryogenic liquid)	2.2	UN1977	N/A

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a non-DOT specification portable tank designed and constructed in accordance with Section VIII of the ASME Code and subparagraphs (1) or (2) of this paragraph. The portable tank is built with a SWAP body or is enclosed in an ISO type frame. The portable tank is vacuum-insulated with or without a supplemental liquid nitrogen shield. Design pressure is 6 psig for the liquid nitrogen tank, if provided. Design temperatures for the inner tank and any part, valve or fitting that may come in contact with liquid helium, liquid hydrogen or liquid nitrogen are -452°F, -423.5°F, and -320°F, respectively. Nominal water capacity of the liquid nitrogen tank is either 385 or 327 U.S. gallons. Tank material is SA 240 type 304, 304N or 304LN stainless steel for the inner tank and the nitrogen tank; and SA 36, ASTM A283 or equivalent carbon steel for the outer jacket.

[redacted]

Tank model number must match tank capacity, MAWP and inner vessel material as follows:

MODEL NUMBER	CAPACITY U.S. GALS	MAWP PSIG	INNER TANK MATERIAL
GCD11000 LHELHY TC 58 04	11000	58	SA240-304
GCD11000 LHELHY TC 64 04	11000	64	SA240-304
GCD11000 LHELHY TC 151 04	11000	151	SA240-304
GCD11000 LHELHY TC 161 04	11000	161	SA240-304
GCD11000 LHELHY TC 58 041N	11000	58	SA240-304LN
GCD11000 LHELHY TC 64 041N	11000	64	SA240-304LN
GCD11000 LHELHY TC 151 041N	11000	151	SA240-304LN
GCD11000 LHELHY TC 161 041N	11000	161	SA240-304LN
GCD11000 LHELHY TC 58 04N	11000	58	SA240-304N
GCD11000 LHELHY TC 64 04N	11000	64	SA240-304N
GCD11000 LHELHY TC 151 04N	11000	151	SA240-304N
GCD11000 LHELHY TC 161 04N	11000	161	SA240-304N
GCD53250 LHY TC 160 04N	14070	160	SA240-304N
GCD48028 LHY TC 160 04N	12690	160	SA240-304N

(1) Each portable tank in hydrogen, refrigerated liquid service, must conform to and must be equipped with special fire-abatement systems in accordance with Gardner Corporation's drawing numbers 7543 revised December 1973, 8727C Rev. E, 3177F dated September 30, 1981, 10536A, 10537B and 10538E dated September 19, 1980 on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA). No new construction is authorized unless the portable tank design conforms with paragraph 7.(a).(2) of this exemption.

(2) New construction after December 31, 1988 must conform with § 178.338, except as follows: Corresponding drawings and calculations must be submitted to the OHMEA prior to first shipment.

[redacted]

(a) Impact testing is not required for type 304, 304LN or 304N stainless steel except when such materials are used for tanks used in cryogenic helium service.

(b) Section 178.338-10 does not apply.

(c) The portable tank need not comply with § 178.338-13(a) and (b). Lifting lugs, framework and any anchoring to the inner tank, the nitrogen tank or tank jacket must conform with § 178.338-13(a). A portable tank that meets the definition of "container" in 49 CFR 450(a)(3) must meet the requirements of 49 CFR Parts 450 through 453 and each tank design must be qualified in accordance with § 178.270-13(c).

(d) Effective August 1, 2002, "DOT-E 8556" must replace the mark "MC-338" on the nameplate specified in § 178.338-18(a).

b. TESTING - Each portable tank must be reinspected and retested once every five years in accordance with § 173.32(e) as prescribed for DOT Specification 51 portable tanks. The test pressure of the inner tank shall be determined from the following formulas:

If there is no vacuum in the outer jacket during the test:

$$P_T = 1.25 \times [P_d + H^s + 14.7]$$

If vacuum exists in the outer jacket during test:

$$P_T = 1.25 \times [P_d + H_s + 14.7] - 14.7$$

where:

P_T = Test pressure (psig)

P_d = Design pressure (maximum allowable working pressure) (psig)

H_s = Static head of liquid in inner tank (psig)

c. OPERATIONAL CONTROLS -

(1) Each portable tank must be prepared and shipped as required in § 173.318, as applicable for the lading.

(2) Shipments by motor vehicle must conform with the following:

(a) The OWTT must be determined for each portable tank used in hydrogen service by the formula:

OWTT = 0.5 x (MRHT-24); for MRHT less than 72 hours.

OWTT = MRHT-48; for MRHT of 72 hours or more.

(b) The provisions of § 177.840 apply to each portable tank used in hydrogen service.

(3) Shipments by cargo vessel must conform with the following:

(a) The package must conform with § 176.76(g). Portable tanks may be overstowed only if enclosed in ISO-type frames and otherwise suitably protected. In all situations, the portable tanks must be stowed such that they are readily accessible and can be monitored in accordance with the provisions of this exemption. Each portable tank in hydrogen service must be stowed in the open and located so as to prevent any accumulation of hydrogen.

(b) The legend "One Way Travel Time (or OWTT) Hours" must be marked on the shipping paper and on the dangerous cargo manifest immediately after the container description. The OWTT is determined by the formula:

OWTT = MRHT - 24 hours.

(c) A written record of the portable tank's lading pressure and ambient (outside) temperature at the following times must be prepared for each shipment:

(i) At the start of each trip;

[redacted]

(ii) Immediately before and after any manual venting;

(iii) At least every 24 hours for tanks in helium service or every 12 hours for tanks in hydrogen service; and

(iv) At the destination point.

(d) The Coast Guard Captain of the Port must be notified of the hydrogen shipment at least 24 hours in advance.

(e) Any lading road relief (pressure control) valve (PCV) set at a pressure lower than that prescribed for the (safety) pressure relief valve must be closed unless the OWTT is determined based on the setting of the PCV.

(4) No person may transport a charged portable tank unless the pressure of the lading is equal to or less than that used to determine the marked rated holding time, and the OWTT is equal to or greater than the elapsed time between the start and termination of travel.

(5) The actual holding time for each tank must be determined after each shipment. If it is determined that the actual holding time is less than 90 percent of the MRHT of the tank, the tank may not be refilled until it is restored to its MRHT or the tank is remarked with the reduced holding time determined by this examination.

(6) Tanks made after July 31, 1987 may be equipped with pressure relief valves conforming with Gardner Cryogenics' drawing 128992B dated March 10, 1987.

8. SPECIAL PROVISIONS:

a. A person who is not a holder of this exemption who receives a package covered by this exemption may reoffer it for transportation provided no modifications or changes are made to the package and it is reoffered for transportation in conformance with this exemption and the HMR.,

b. Shippers using the packaging covered by this exemption must comply with all provisions of this exemption, and all other applicable requirements contained in 49 CFR Parts 171-180.

[redacted]

c. MARKING - Each portable tank must be plainly marked on both sides near the middle, in letters at least two (2) inches high on a contrasting background, "DOT-E 8556". Each portable tank used in hydrogen service must be marked "One-way travel time Hour" or "OWTT _____ Hours" in letters at least 2 inches high near the "DOT-E 8556" marking. The proper OWTT must be determined using the formulas found in subparagraphs 7.c.2 or 7.c.3 of this paragraph.

d. Transportation of Division 2.1 (flammable gases) are not authorized aboard cargo vessels unless specifically authorized in the Hazardous Materials Table (§ 172.101).

9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle and cargo vessel (see restriction in paragraph 8.d).

10. MODAL REQUIREMENT: A current copy of this exemption must be carried aboard each cargo vessel or motor vehicle used to transport packages covered by this exemption.

11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this exemption and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:

- All terms and conditions prescribed in this exemption and the Hazardous Materials Regulations, 49 CFR Parts 171-180.
- Persons operating under the terms of this exemption must comply with the security plan requirement in Subpart I of Part 172 of the HMR, when applicable.
- Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this exemption must receive training on the requirements and conditions of this exemption in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this exemption, including display of its number, when this exemption has expired or is otherwise no longer in effect.

[redacted]

12. REPORTING REQUIREMENTS: The carrier is required to report any incident involving loss of packaging contents or packaging failure to the Associate Administrator for Hazardous Materials Safety (AAHMS) as soon as practicable. (Sections 171.15 and 171.16 apply to any activity undertaken under the authority of this exemption.) In addition, the holder(s) of this exemption must inform the AAHMS, in writing, of any incident involving the package and shipments made under the terms of this exemption.

Issued in Washington, D.C.:

MAR 1 5 2004

(DATE)

Robert A. McGuire
for Associate Administrator for
Hazardous Materials Safety

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Research and Special Programs Administration, Department of Transportation, Washington, D.C. 20590. Attention: DHM-31.

Copies of this exemption may be obtained by accessing the Hazardous Materials Safety Homepage at http://hazmat.dot.gov/exemptions Photo reproductions and legible reductions of this exemption are permitted. Any alteration of this exemption is prohibited.

PO: PTO/DL

JUN 7 2004

The following are hereby granted party status to this exemption based on their application(s) submitted in accordance with § 107.107 or § 107.109, as appropriate:

Company Name City/State	Application Date	Issue Date	Expiration Date
Air Liquide Japan, (formerly Teisan Kabushiki) Tokyo, JP (U.S. Agent: Air Liquide America Corporation Houston, TX)	Feb 25, 2004	Apr 29, 2004	Jan 31, 2006
Air Products Helium, Inc. (APHI) Allentown, PA	Jan 08, 2004	Mar 15, 2004	Jan 31, 2006
Iwatani International Corporation of America Fort Lee, NJ	Jan 30, 2004	Mar 15, 2004	Jan 31, 2006
L'Air Liquide Corporation Paris, FR (U.S. Agent: Air Liquide America Corporation Houston, TX)	Feb 25, 2004	JUN 7 2004	Jan 31, 2006
National Welders & Supply Co., Inc. Charlotte, NC	Feb 23, 2004	Apr 29, 2004	Jan 31, 2006
Praxair Puerto Rico B.V. Gurabo, PR	Jan 30, 2004	Mar 15, 2004	Jan 31, 2006
Praxair, Inc. Danbury, CT	Feb 27, 2004	Apr 29, 2004	Jan 31, 2006

Robert A. McGuire
for Associate Administrator for
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JUN 7 2004
(DATE)